

Application No.: 10/627461

Case No.: 57989US004

Remarks

Favorable reconsideration of this application in light of the amendments and the following discussion is respectfully requested. Claim 1 has been amended and claim 4 has been canceled. Claims 1-3 and 5-10 remain pending in this application for consideration.

Amendments to the Claims

Claim 1 is amended to incorporate the limitations of canceled claim 4 and to clarify that the perfluoropolymer is essentially free of ionic end groups prior to isolation of the perfluoropolymer from the aqueous dispersion in which it was formed. Support for the amendments to claim 1 can be found, for example, at page 2 lines 30-33, page 3 lines 16-18, and page 4 lines 11-15 of the specification. No new matter has been introduced.

Claim Rejections**Rejection under 35 U.S.C. § 103**

Claims 1-10 are rejected under 35 U.S.C. 103(a) as purportedly being unpatentable over Schmiegell, U.S. 5,973,091 [hereinafter Schmiegell], in view of Beyer et al., U.S. 5,463,021 [hereinafter Beyer], and further in view of Legare et al., WO 95/02634 [hereinafter Legare].

Claim 1 relates to a curable fluoroelastomer composition comprising a perfluoropolymer obtained through an aqueous emulsion polymerization process and having one or more cure-sites selected from a halogen capable of participating in peroxide cure reaction and/or nitrile groups; an organic peroxide and/or a compound capable of effecting curing of the perfluoropolymer through said nitrile groups; and optionally a polyunsaturated coagent. The perfluoropolymer is, prior to the isolation of the perfluoropolymer from the aqueous dispersion in which it was obtained, essentially free of ionic end groups and the total amount of metal cations in the composition is not more than 10µg/g perfluoropolymer.

There were basically 3 known ways that metal ions could get into the finished articles: 1) they could be introduced in the polymerization by the salts used in the emulsion polymerization recipe, 2) they could be further introduced during the latex work up by the salts used to coagulate the latex, and/or 3) they could be introduced in the compound by the use of metal oxides as acid acceptors prior to curing. Prior to the present invention, it was not known that the elimination of most of the ionizable endgroups from the fluoropolymer prior to the work up phase (regardless of

Application No.: 10/627461

Case No.: 57989US004

the technique employed for work up) would have a significant impact on the residual metal ion content of the ultimate fluoroelastomer composition.

Thus, the invention as defined in claim 1 requires that the fluoropolymer component be, prior to its isolation from the aqueous dispersion, essentially free of ionic end groups, and further requires that the fluoroelastomer composition have a total amount of metal cations of not more than 10 μ g/g perfluoropolymer.

In the Office Action, the Examiner notes that Schmiegel is directed to the preparation of curable perfluoroelastomer compositions in which the ionized or ionizable endgroups can be reduced by decarboxylation. The Examiner correctly admits in ¶ 5 of the Office Action that Schmiegel "is silent about using a fluoroelastomer [sic] composition having the claimed content of metal cations, which is less than 10 μ g/g polymer."

In order to account for Schmiegel's failure to teach, suggest or describe a composition wherein the total amount of metal cations is not more than 10mg/g perfluoropolymer, the Examiner combines the description of Beyer with Schmiegel. The Examiner asserts that Beyer teaches that aqueous dispersions can be purified, the purification involving steps such as compressing, coagulation, and elution through ion-exchange resins to replace metal ions with proton ions.

However, the combination of Schmiegel and Beyer still falls short of teaching, suggesting, or describing the invention of claim 1, as further acknowledged by the Examiner. In this regard, the Examiner has replaced the previous reliance on Grootaert with Legare as an essential reference to combine with Schmiegel and Beyer.

However, in addition to the failure of the Schmiegel and Beyer to disclose a fluoroelastomer composition having the claimed content of metal cations, each also fails to disclose a perfluoropolymer component that is, prior to the isolation of the perfluoropolymer from the aqueous dispersion in which it was obtained, essentially free of ionic end groups. That is, the claimed perfluoropolymer is essentially free of ionizable endgroups from the polymerization step, even before the perfluoropolymer is isolated by the work up process.

In contrast, Schmiegel teaches that the ionized or ionizable endgroups can later be reduced by decarboxylation, while Beyer teaches purification involving steps such as compressing, coagulation, and elution through ion-exchange resins.

Legare likewise fails to teach a perfluoropolymer component that is, prior to the isolation of the perfluoropolymer from the aqueous dispersion in which it was obtained, essentially free of ionic end groups. Legare instead is concerned with a fluoroelastomer composition comprising a peroxide-

Application No.: 10/627461

Case No.: 57989US004

curable fluoropolymer, organic acid acceptor, organic peroxide, and coagent, the fluoroelastomer composition being substantially free from extractable metals and metal compounds. Legare teaches that you can use organic acid acceptors in the fluoroelastomer compositions instead of having to use metal oxide acid acceptors, to thereby reduce the amount of extractable metals and metal compounds in the resulting fluoroelastomer compositions. Legare is silent about providing a perfluoropolymer component that is itself essentially free of ionic end groups.

It is noted at MPEP 2143.03 that, "to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974) (emphasis supplied). As discussed, none of the references teach or suggest a fluoroelastomer composition comprising a perfluoropolymer component that is, prior to the isolation of the perfluoropolymer from the aqueous dispersion in which it was obtained, essentially free of ionic end groups. Accordingly, the Office Action fails to set forth a *prima facie* case of obviousness of claim 1 based upon Schmiegel, Beyer and Legare.

It is therefore requested that the Examiner reconsider and withdraw the rejection of claim 1 under 35 USC §103(a). In addition, claims 2, 3, and 5-9 depend, either directly or indirectly, from claim 1 and are patentable over the references at least on that basis, so that the rejections of these claims should also be withdrawn.

Claim 10 defines a perfluoropolymer obtained by an aqueous emulsion polymerization and comprising units derived from a fluorinated monomer selected from tetrafluoroethylene, chlorotrifluoroethylene and mixtures thereof, one or more units derived from a fluorinated monomer selected from perfluorinated C₃-C₈ olefins, perfluorinated vinyl ethers and mixtures thereof and one or more units deriving from fluorinated cure-site monomers selected from perfluorinated monomers having one or more halogen atoms capable of participating in a peroxide cure reaction or one or more nitrile groups, the perfluoropolymer comprising perfluoroaliphatic end groups and/or CF₂Cl end groups and being essentially free of ionic end groups and the amount of metal ions contained in the perfluoropolymer being less than 10µg/g of perfluoropolymer.

As discussed above with regard to claim 1, Schmiegel, Beyer and Legare are each silent about providing a perfluoropolymer component that is itself essentially free of ionic end groups, instead teaching only other means of obtaining a curable fluoroelastomer composition (including, among other components, a fluoropolymer component) that has been "purified." Accordingly, the Office Action also fails to set forth a *prima facie* case of obviousness of claim 10 based upon Schmiegel, Beyer and Legare.

Application No.: 10/627461

Case No.: 57989US004

Conclusion

In view of the foregoing remarks, favorable reconsideration of the present application and the passing of this case to issue with all claims allowed are courteously solicited.

Should the Examiner wish to discuss any aspect of this application, applicants' attorney suggests a telephone interview in order to expedite the prosecution of the application.

Respectfully submitted,

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Date

By: Brian E. Szymanski Reg. No.: 39,523
Telephone No.: (651) 737-9138

Office of Intellectual Property Counsel
3M Innovative Properties Company
Facsimile No.: 651-736-3833